REMARKS

Claims 1, 3, and 4 stand rejected under 35 USC § 102(e) as being anticipated by Mirelman '588. Applicant respectfully submits that the cited reference fails to anticipate Applicant's claimed subject matter.

Claim 1 sets forth a method in which an extract of *Allium sativum* is supplied to a cellulosic material to protect the material from fungi. The cited reference teaches no such method. To the extent the Examiner is relying upon the cited sections of Col. 2, lines 35-45; Col. 3, lines 25-30 and 42-60; and Col. 4, lines 35-67, Applicant respectfully submits that in none of the cited sections is it disclosed to apply an extract of *Allium sativum*, as set forth in Applicant's specification, to a cellulosic material to prevent fungi from growing on the cellulosic material. Rather, the Mirelman '588 reference teaches the use of an enzyme *alliinase* as a binding agent for a separation chromatography column. While *alliinase* is a derivative from a garlic extract, there is no identification of *alliinase* as having any antimicrobial or antifungal properties; rather, *alliinase's* only known function is as an enzyme.

Further, when Applicant's claim 1 is considered in light of the teachings of the specification, it is clear that the step of applying the cellulosic material is done simply by physical contact between the cellulose and the extract from *Allium sativum*. In contrast, the cited reference does not teach a garlic extract but rather an enzyme purified from garlic. The enzyme will not, in and of itself, bind to cellulose, but requires either a physical entrapment or surface preparation of the cellulose by means of a covalent bonding agent (Col. 2, lines 40-45; Col. 3, lines 25-30; Col. 3, line 60-Col. 4, line 2; Col. 4, lines 19-25). In every instance in which cellulose is mentioned in the cited reference with respect to the enzyme *alliinase*, there is a binding reaction or entrapment mechanism which requires a specialized substrate in order to effect the interaction between cellulose and the enzyme.

The methodology set forth in claim 1, when viewed in light of the teachings of the specification, is clearly directed to an extract of garlic applied to a cellulosic substrate in which the cellulosic substrate required no modification, preparation, or use of a covalent bonding agent. Further, the description of the extract of *Allium sativum* as set forth in

J. Bennett Mullinax, LLC
P O Box 26029
Greenville, SC 29616-1029
(V) 864 987 9696
(F) 864 987 9686

claim 1 is a multi-phase emulsion of the water soluble and aqueous soluble components of the processed garlic. In contrast, the cited reference is directed only to a purified enzyme covalently bonded to cellulose and the characterization of which indicates there is no antifungal properties associated therewith. Accordingly, it is respectfully submitted that claim 1 is not anticipated by Mirelman '588.

Claims 3 and 4 also stand rejected as being anticipated by Mirelman '588. Applicant respectfully submits that Mirelman does not teach any type of a dipping process in which cellulosic material has an extract of *Allium sativum* applied. In addition, the subject matter of claim 4 is directed to a pressure treatment process of a cellulosic material which Applicant respectfully submits is not anticipated by the cited reference. Accordingly, Applicant respectfully submits that claims 3 and 4 are not anticipated by Mirelman '588.

Claims 2, and 5-13 stand rejected under 35 USC §103(a) as being unpatentable over Mirelman '588. Applicant respectfully submits that Mirelman '588 fails to establish a *prima facie* case of obviousness.

The Examiner relies upon Mirelman '588 for the proposition that it is known in the art to "bond cellulose with *Allium sativum*". As stated above with respect to the rejection of claim 1, the Mirelman '588 reference is not directed to an aqueous extract of *Allium sativum*, but to a purified enzyme obtained from *Allium sativum*.

With respect to claim 2, the subject matter is directed to spraying the solution comprising an effective amount of the *Allium sativum* extract to a cellulosic material. As set forth above in response to the §102(a) rejection, the cited reference makes no use of spraying a solution on any type of cellulosic material. In fact, the Mirelman '588 reference teaches an elaborate protocol in which a covalent bonding agent must be present on a cellulosic substrate before there will be any chemical bonding between the purified enzyme and the cellulose.

If the *alliinase* disclosed in Mirelman '588 was directly applied to a cellulose substrate as set forth in Applicant's claim 2, the resulting cellulosic substrate would be inoperable for the purposes set forth in Mirelman '588. Without adequate surface preparation of the cellulosic substrate, no adequate bonding would occur. The cited

J. Bennett Mullinax, LLC
P O Box 26029
Greenville, SC 29616-1029
(V) 864 987 9696
(F) 864 987 9686

reference is directed to a purification protocol which requires a high affinity binding of the purified enzyme to the cellulose. Merely spraying or coating of an unmodified cellulose would not achieve the strength of the bond needed to carry out further separation protocols. Likewise, applying Applicant's claimed extract to the cellulosic material in Mirelman '588 would render the Mirelman '588 process inoperative since the extract of Applicant's claimed subject matter is not the purified *alliinase* enzyme needed to achieve the purification process of Mirelman '588. The claimed subject matter in the cited reference are directed to different end uses and make use of different extracts in order to achieve their respective stated purposes. Accordingly, it is respectfully submitted that the subject matter of claim 2, which calls for a spraying application of a solution onto a cellulosic material, is not rendered unpatentable by the cited reference.

The cellulosic substrate taught by Mirelman '588 requires either a special modified artificial cellulosic substrate to encapsulate the enzyme or teaches the use of a cellulosic preparation step in which a covalent bonding agent is used to bond the enzyme to the cellulosic substrate. When Applicant's claim 2 is evaluated in light of the teachings of the specification, it is made clear that no surface preparation or chemical modification of a cellulosic material is required. Further, absent any evidence or teaching that the enzyme *alliinase* has any antimicrobial or antifungal properties, there would be no incentive to undertake such steps so as to bind *alliinase* to a cellulosic substrate.

Claim 4 is directed to a pressure treatment process of applying the solution to a cellulosic material. Nowhere in the cited reference of Mirelman '588 is there a discussion of using pressure treatment to apply a solution to a cellulosic material. To the extent the Examiner states that the method of applying the substrate requires only routine skill, it is respectfully submitted that the cited reference teaches surface modification of the cellulose as an essential component prior to binding the taught enzyme to the substrate. Applicant's process is not directed to binding the enzyme *alliinase* nor does it require the use of a treatment of a cellulosic substrate by a covalent bonding agent as is taught in Mirelman '588. Accordingly, Applicant respectfully submits the subject matter of claim 4 is patentable over the rejection of record.

J. Bennett Mullinax, LLC
P O Box 26029
Greenville, SC 29616-1029
(V) 864 987 9696
(F) 864 987 9686

Claims 5 and 6 are further directed to specific cellulosic substrates including green lumber, dry lumber, pressure treated lumber, seeds, grains, legumes, fruits, vegetables, and plants. The Examiner has stated in the Office Actions of record that the cited reference does not teach use of other cellulosic containing materials. Applicant further submits it is not obvious to modify the teachings of Mirelman '588 since Mirelman '588 teaches a surface modification and covalent bonding agent applied to the cellulosic material. Applicant's claims, read in light of the specification, make clear that such treatment need not occur. Further, to the extent the covalent bonding agents and bonding conditions were applied to seeds, grains, legumes, fruits, vegetables, and plants, the cellulose modification steps involve 16 hours incubation at 4° C with shaking. Such conditions would render the subsequent biological material unusable for the intended purpose. It is also noted that the various covalent attachments set forth in Col. 7 and Example 1 involve a variety of chemical additives which are not suitable for application to cellulosic material intended for ingestion or to live plants. Accordingly, it is respectfully submitted that the subject matter of claims 5 and 6 are not rendered unpatentable by the cited reference.

The subject matter of claim 7 is directed to a process in which a preservative is applied to wood. It is respectfully submitted that there is no teaching or suggestion in the Mirelman '588 reference for the invention as claimed. Accordingly, the subject matter set forth in claim 7 is believed to be in condition for allowance.

With respect to claim 8, the subject matter of claim 8 is directed to specific effective amounts of the *Allium sativum* extract. It is respectfully submitted that it is not obvious to use the selected claim ranges since the claimed method involves a soluble extract of *Allium sativum* and the cited reference is directed to the use of a purified enzyme which is covalently bound to a cellulosic substrate.

With respect to claim 9, the subject matter is directed to the application of the extract onto a non-porous surface. The cited reference provides no teaching or suggestion of use of non-porous surfaces. To the extent any component of a garlic extract is disclosed, it is in the form of a purified enzyme which is applied to a porous, absorbent substrate such as cellulose. Even then, the cited reference requires a

J. Bennett Mullinax, LLC
P O Box 26029
Greenville, SC 29616-1029
(V) 864 987 9696
(F) 864 987 9686

covalent bridge molecule in order to bring about the bonding. In light of this, there is no suggestion of using the claimed garlic extract for application onto a non-porous surface.

Claim 10 is directed to specific non-porous surfaces which Applicant respectfully submits are not fairly taught or suggested by the cited reference. The claimed subject matter is directed to materials as specifically recited, including porcelain, ceramic, marble, synthetic marble, fiberglass, stainless steel, and plastic. Claim 10, when read in light of the teachings of the specification, makes clear that simple application such as by spraying is sufficient to impart the antifungal and antibacterial properties to the substrate. To the extent Mirelman '588 teaches an elaborate physical and chemical protocol in order to achieve binding to a porous cellulosic structure, Applicant respectfully submits that no fair reading of Mirelman '588 discloses use of a garlic extract for prevention of mold and mildew on a non-porous surface.

Claim 11 is directed to a composition of a specified volume-to-volume range of about 1:1 to about 1:100,000,000 of an extract of *Allium sativum*. The extract, as defined and set forth in the specification is a multi-phase aqueous soluble component from garlic as opposed to a highly purified enzymatic fraction of *alliinase* as set forth in the '588 reference. It is noted that nowhere in the '588 reference is the protective nature of an *alliinase* treated cellulosic material from fungi disclosed or suggested. In fact, one having ordinary skill in the art and knowledgeable of the enzyme *alliinase* would realize that the enzymatic properties of *alliinase* do not impart any direct benefit to a cellulosic substrate. The cellulosic substrate is merely a convenient, covalent attachment site for a laboratory purification protocol. Fungal protection of the cellulosic material is neither mentioned, suggested, nor would occur and is therefore not rendered obvious by the cited reference.

Claim 12 is directed to a treated lumber article having a surface containing an effective amount of an antifungal agent of an extract of *Allium sativum*. Applicant respectfully submits that the purified enzyme *alliinase* disclosed in the '588 reference has no antifungal properties. Further, to the extent the enzyme is associated with a cellulosic substrate, the cellulosic substrate is not a treated lumber article. In addition, the Mirelman '588 reference is clearly directed to the use of chemical binding agents in

J. Bennett Mullinax, LLC
P O Box 26029
Greenville, SC 29616-1029
(V) 864 987 9696
(F) 864 987 9686

order to couple the enzyme to the cellulose. Claim 12, interpreted in light of the teachings of the specification, is directed to a simple surface application of the extract onto a processed wood product. No support, teaching or suggestion for such an article is provided in the cited reference. In fact, application of *alliinase* onto a wood product would not achieve the antifungal properties noted by Applicant since *alliinase* has no demonstrated antifungal properties.

Claim 13 is directed to the subject matter of a treated lumber article in which the anti-fungal agent and extract has been applied by pressure. Pressure injection of agents, particularly used in wood and lumber articles, is well known to be a process that does not rely or depend upon a chemical bonding to hold or retain the materials within the wood. In contrast, the cited reference, to the extent cellulose is discussed at all, requires a chemical covalent bonding agent or an artificial cellulosic substrate that has been specifically modified to encapsulate or capture the *alliinase*. Even if the *alliinase* enzyme of the cited reference were pressure injected into a cellulosic substrate, it is respectfully submitted that no antifungal properties would be demonstrated. There is no teaching or suggestion within the art that *alliinase* imparts any antifungal properties to materials.

Inasmuch as all outstanding issues raised by the Examiner have been addressed, it is respectfully submitted that the present application is in condition for allowance, and action to such effect is earnestly solicited. The Examiner is encouraged to telephone the undersigned at his/her convenience should only minor issues remain after consideration of the present Amendment, to permit early resolution of same.

Please charge any additional fees required by this Amendment to Deposit Account No. 50-3172.

Respectfully submitted,

J. BENNETT MULLINAX, LLC

J. Bennett Mullinax
Reg. No. 36,221

J. Bennett Mullinax, LLC
P O Box 26029
Greenville, SC 29616-1029
(V) 864 987 9696
(F) 864 987 9686